

Stillwater Pasture Renovation Project – Site B, Year 1

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2019

County: Stillwater
Average annual precip: 15"
MLRA: 58A, Northern rolling plains
Dominant Soil Type: Tanna clay loam, 2-8% slopes
Acres: 139.3
Planting Date: May 10, 2019
Seeding Rate: 483,418 seeds/ac = 11 seeds/ft² = 29 lb/acre
Seed cost: \$31.72/acre (inoculant, and seed)
Seeding Method: John Deere 15' no-till drill, single disk opener
Row Spacing: 7.5"
Tillage: No-till
Previous Crop and Year: Perennial forage, intermediate wheatgrass
Herbicides: 60 oz glyphosate, May 5th
Post-emergence: None
Insecticides/Fungicides: None
Fertilizer: None
Irrigation: Dryland
Termination Date: August 23, 2019
Termination Method: Grazing
Next Crop: Annual cover crop, spring 2020



Fig. 1. Annual cover crop July 12, 2019. Notice the abundance of alfalfa.

Table 1. Monthly precipitation at Columbus, MT. Western Regional Climate Center, station #241938.

Columbus	J	F	M	A	M	J	J	A	S	O	N	D	Total
30 yr avg 1989-2019	0.61	0.67	1.08	1.85	2.69	2.27	1.18	0.93	1.31	0.93	0.64	0.57	14.99
2018	0.85	1.51	0.65	2.48	5.82	2.56	1.15	1.25	0.77	0.88	0.69	0.43	19.04
2019	0.59	1.45	0.51	2.83	3.60	2.65	2.88	0.72	5.01	1.87	0.73	0.14	22.98

Introduction:

Multiple pastures in Stillwater County are being converted from crested or intermediate wheatgrass monoculture to a more diverse perennial forage mix. Wheatgrass is killed with herbicide in the spring of Year 1. Annual cover crops are grown and grazed for two years to provide forage, allow for adequate kill of the wheatgrass, and to provide soil health benefits. Diverse perennial pasture mixes will be seeded in Year 3. This report gives results of Site B after the first year of annual cover crops. It should be noted that 2019 was a wet year, with close to 23 inches of total precipitation in Stillwater County, or 8 inches more than the 30-year normal.

Results:

This site was sprayed with 60 oz/acre of glyphosate on May 5 to kill the existing pasture species of intermediate wheatgrass and alfalfa. The timing of the spray was too early given the cooler weather, and the alfalfa did not adequately kill. An annual cover crop mix was seeded on May 10 with a single-disc no-till drill (Table 2). The cover crop was sampled on July 12 and again August 13 with three hoop clippings. Total aboveground biomass after air-drying was 5,292 lb/acre, or 2.6 ton/acre on July 12 and 5,868 lb/acre, or 2.9 ton/acre on Aug. 13. There were 967 Growing Degree Days (base 40) from seeding to the July 12 clipping and 1883 Growing Degree Days (base 40) from seeding to the Aug. 13 clipping. Using the Aug. 13 clipping weights, and assuming 910 lbs of forage per animal month and 50% utilization rate on 139.3 acres, there were 449 AUMs available in this field.

Table 2. Annual cover crop mix seeded in Site B, May 10, 2019.

Cover Crop Species	Seeding Rate (lb/ac)	Percentage of mix
Field Pea	10	4
Soybean	6	6
Pearl Millet	1.5	26
Sorghum-sudangrass	6	21
Spring Barley	3	7
Forage Collards	0.5	18
Turnip	0.25	13
Sunflower	2	5
TOTAL	29.25	100

Summary and Discussion:

Site B produced good forage quantity in 2019. However, about 30% of this was from alfalfa that was not killed. The May 5 glyphosate application killed the intermediate wheatgrass, but did not impact the alfalfa. Removing the wheatgrass competition allowed the suppressed alfalfa a chance to flush. The spring was cooler than normal and alfalfa was late starting. This resulted in a large component of alfalfa that grew back with the cover crop. In hindsight, the site should have been sprayed the third or fourth week in May when temperatures were warmer with an herbicide mix containing a broadleaf component for alfalfa termination. The cover crop should also have been seeded later, around June 1. A warm-season cover crop would be the best fit for this seeding window.

Field bindweed pressure was also a concern. Populations of field bindweed greatly increased following the spraying of the intermediate wheatgrass. We expect this will have a negative effect on the planned native seeding in year 3. The 2020 annual cover crop will be a warm-season grass monoculture such as sorghum-sudangrass to allow for in-crop broadleaf herbicide application for bindweed control and will ensure that weeds have ample time in the spring to germinate prior to chemical application and seeding. We would prefer to use a diverse annual cover crop and not a monoculture. However, because the long-term goal of the project is to move this pasture to greater perennial diversity, we believe using a monoculture cover crop in the short term to help control weeds and alfalfa will help us get a diverse perennial stand established for long-term soil health and grazing.



Fig. 2. Cover crop at time of clipping, July 12, 2019 (l). Notice the abundance of alfalfa in bloom. Cover crop again on Aug 13, 2019 (r). Dried plants are peas that are shelling out.